

Date: Wednesday, 5/2/2007 3:48:51 PM
User: Kim Johnston

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 212/205 HIGH AFT X-TUBE ASSEMBLY
Job Number	: 32150		
Estimate Number	: 10257		
P.O. Number	:	Part Number	: D212664201
This Issue	: 5/2/2007 S.O. No. :	Drawing Number	: D212-664-241 REV C
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : LANDING GEAR	Drawing Revision	: C
Previous Run	: 32149	Material	:
Written By	:	Due Date	: 5/30/2007 Qty: 1 Um: Each
Checked & Approved By	: <u>07.05.02</u>		
Comment	Est Rev:E 04-02-16 Reformat K/DS Est Rev:F 06-03-29 Remove Coments on Pick List JLM Est Rev:G 07-04-30 As per Rev C JLM		

Additional Product

Job Number:



SC5BP

Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
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Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per RPP D212-664-201CHG003

SA 07/05/05

2.0	D6006129	Crosstube material
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part number	Description	Batch
1	D6006-129	Crosstube	<i>B2654Y</i>

Check OD = 3.250"; ID = 2.220"

SA 07/05/05

3.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
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Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114

2-Turn first side as per Folio FA114

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

SA 07/05/05

4.0	QC1	INSPECT ALL DIM TO DIM SHEET
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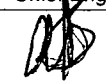
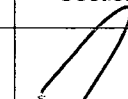
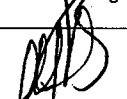

Comment: INSPECT ALL DIM TO DIM SHEET

SA 07/05/05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07/09/18	3.0	- Tube IS too short - One coffee IS too long	 07/09/27	Tube WAS SCRAPPED	S.L. 07/09/18	 07/09/27	 07/09/27	 07/09/27

NOTE: Date & initial all entries

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Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA114

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

8/07/05/05

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

8/07/09/18

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241

9.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of machining

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Job Number: 32150

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

13.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-241 using CNC bender program 212-af and Folio FT007

14.0

QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

15.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

16.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

17.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

19.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: _____

LPI as per ASTM 1417 Level 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number: 32150

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

Attach copy of NDT results to work order

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

21.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: DIMENSIONAL CHECK

Inspect for damage & ensure results are as per Dwg D212-664-241

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

24.0

D29401

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2940-1 Support

25.0

D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.0242 sf(s)/Unit Total : 0.0242 sf(s)

Rubber Cushion (per sq ft)

.63" x 5.300

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Drawing Name: 212/205 HIGH AFT X-TUBE ASSEMBLY

Job Number: 32150

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

26.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp _____

27.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: _____

Expiry Date: _____

2-Install clamps as per Dwg D212-664-241. Torque clamps to 80-100 in lb.

28.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

30.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Placard

Batch: _____

31.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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Job Number: 32150

Part Number: D212664201

Job Number:



Seq. #:	Machine Or Operation:	Description :
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32.0	AN641A	Bolt
------	--------	------



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
Bolt
Batch: _____

33.0	AN960JD616	Washer
------	------------	--------



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)
Washer
Batch: _____

34.0	MS21042L6	Nut
------	-----------	-----



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)
Nut
Batch: _____

35.0	QC4	INSPECT 100% KITS FOR COMPLETENESS
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Comment: INSPECT 100% KITS FOR COMPLETENESS

36.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: HAND FINISHING RESOURCE #1
Identify and pack for shipping as per PPP D212-664-201

37.0	QC21	FINAL INSPECTION/W/O RELEASE
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Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



Handwritten signature and date: 5/2/07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 32150
Description: Crosstube Assembly (205/212 High Aft)		Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: B/C PH 07-05-02		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.200	/			
	R0.063	+/-0.010	.063	/			
	2.990	+0.005/-0.000	2.993				
	5.237	+/-0.030	5.250				
	2.600	+0.005/-0.000	2.600				
	2.686	+0.005/-0.000	2.686				
	2.770	+0.005/-0.000	2.770				
	2.854	+0.005/-0.000	2.856				
	2.938	+0.005/-0.000	2.941				
	3.021	+0.005/-0.000	3.022				
	3.133	+0.005/-0.000	3.133				
	3.179	+0.005/-0.000	3.179				
SIDE B	0.200	+/-0.010	.200	/			
	R0.063	+/-0.010	.063	/			
	2.990	+0.005/-0.000	2.992				
	5.237	+/-0.030	5.208				
	2.600	+0.005/-0.000	2.602				
	2.686	+0.005/-0.000	2.688				2.689
	2.770	+0.005/-0.000	2.772				2.772
	2.854	+0.005/-0.000	2.856				2.856
	2.938	+0.005/-0.000	2.938				2.940
	3.021	+0.005/-0.000	3.022				3.024
	3.133	+0.005/-0.000	3.136				3.135
	3.179	+0.005/-0.000	3.175				3.182
	124.36	+/-0.020	124.28	-			

Measured by: J.B.	Audited by:	Prototype Approval:	N/A
Date: 07/05/05	Date:	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	

DART AEROSPACE LTD		Work Order:	32150
Description: Crosstube High Aft (205/212)		Part Number:	D212-664-201
Inspection Dwg: D212-664-241 Rev: BC PH 07.05.02		Page 1 of 1	

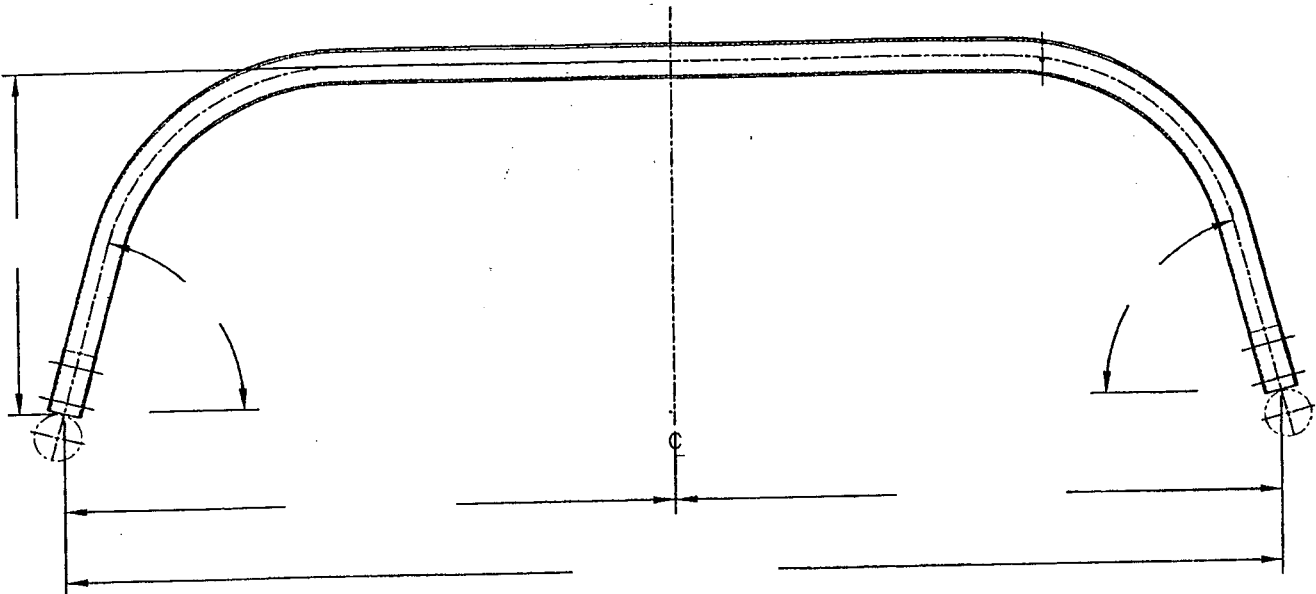
Required Dimension	Min	Max
Height	24.17 24.24	24.30 24.43
1/2 Span	53.59 53.66	53.78 53.85
Angle	49	52
Total Span	107.32	107.56

107.13

107.70

PH 07.05.02

} PH 07.05.02



Comments

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	<i>[Signature]</i>

DART

DESIGN <i>PH</i>	DRAWN BY <i>PH</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D212-664-241	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE NTS
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

RELEASED
07.04.24
PER E.C.N 2009

Qty	Part Number	Description
X	D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
1	D6006-129	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
4	MS21920-28	CLAMP (OR MS21920-30)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

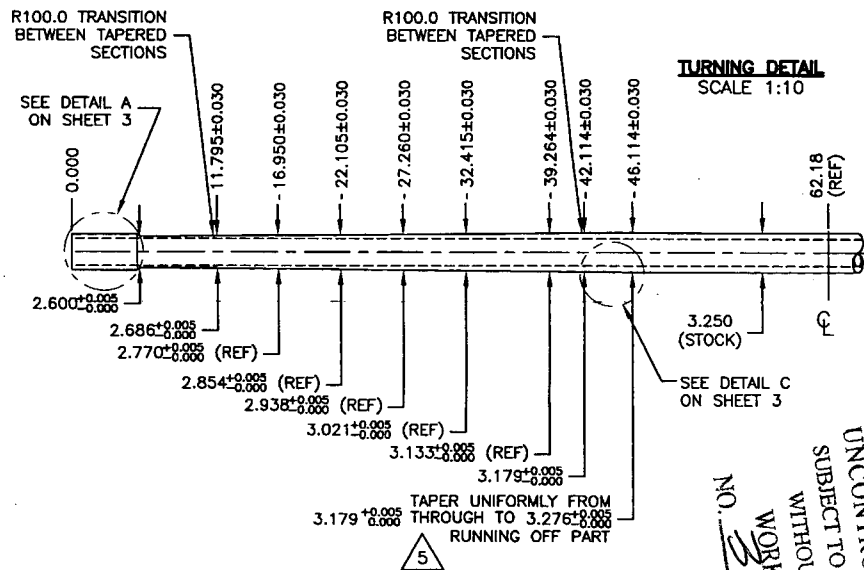
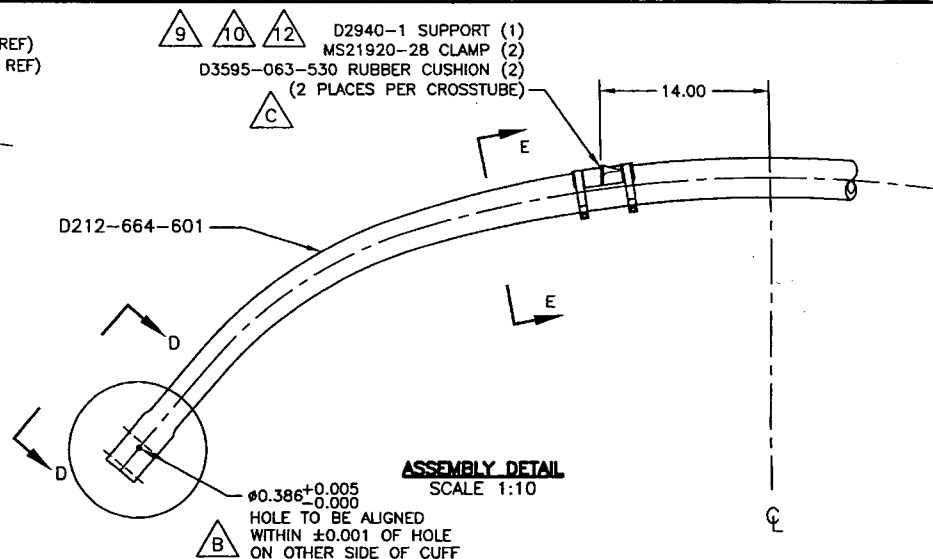
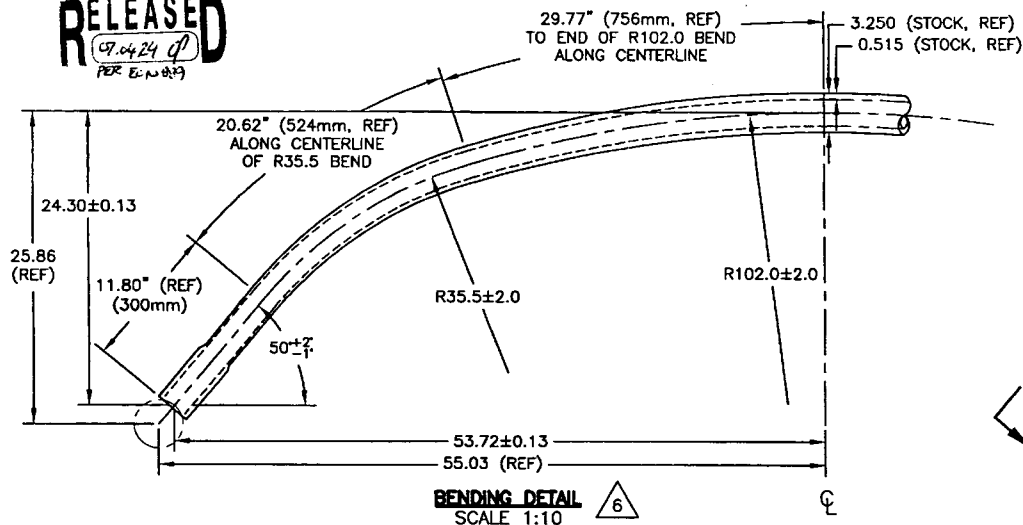
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.36 ± 0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE D2940-1 SUPPORT ON TOP SIDE OF CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
NOTE: MS21920-30 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 32150

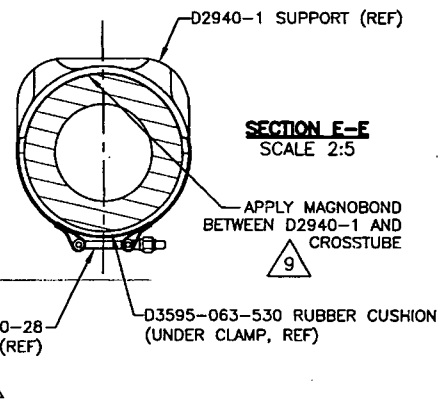
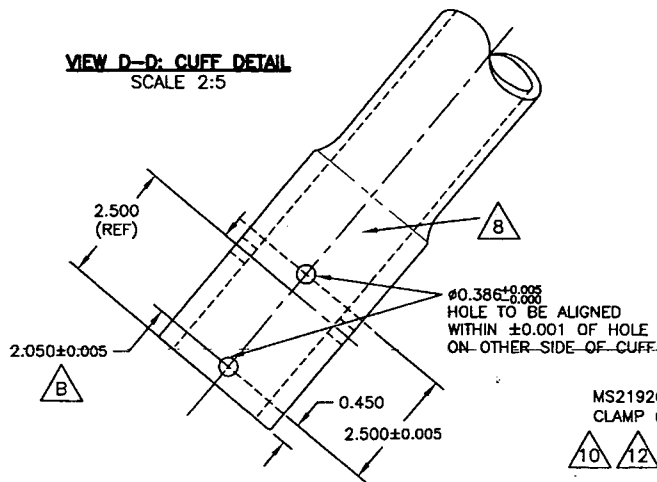
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RELEASED
07.04.24
PER E.N. 013



VIEW D-D: CUFF DETAIL
SCALE 2:5



NO. 32150
WORK ORDER
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ENGINEERING
RETURN TO
SHOP COPY

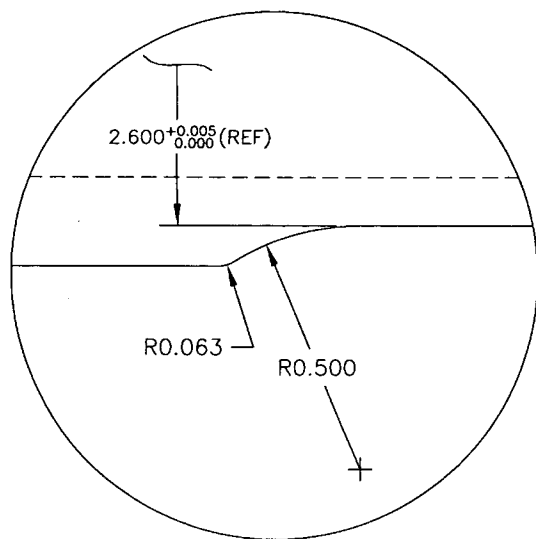
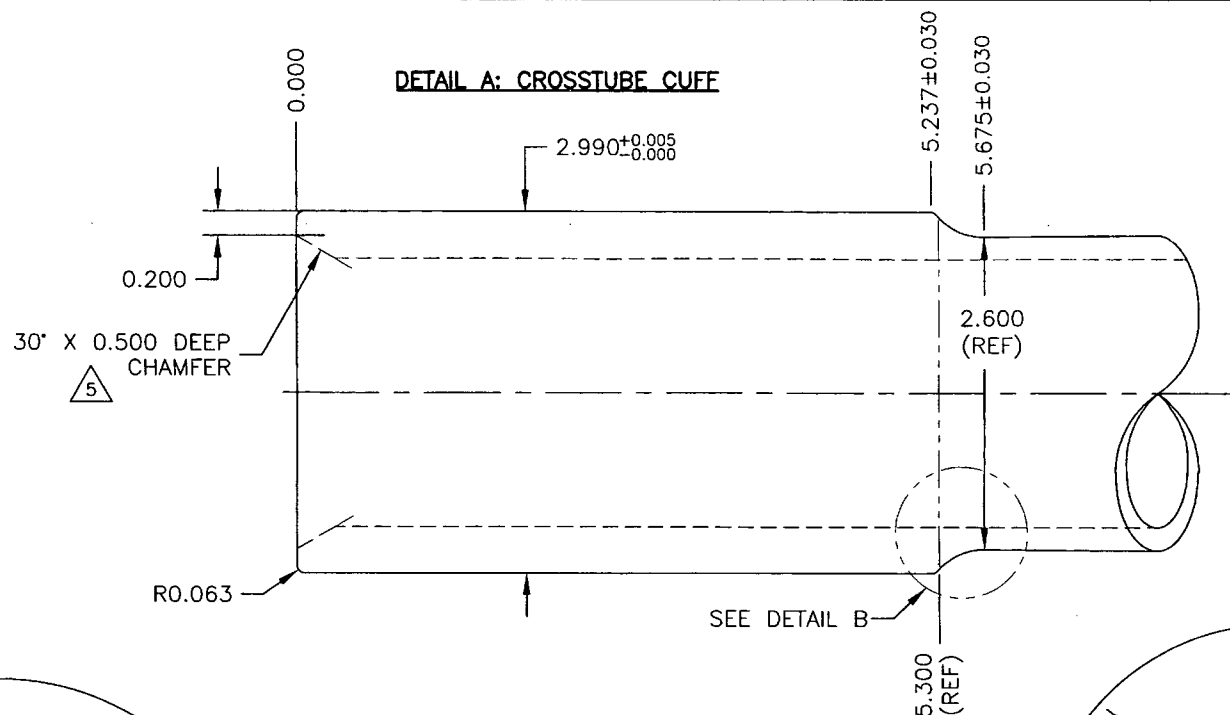
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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED J	APPROVED A	DRAWING NO. D212-664-241	REV. C
DATE 07.03.08	TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SHEET 2 OF 3	SCALE 1:10

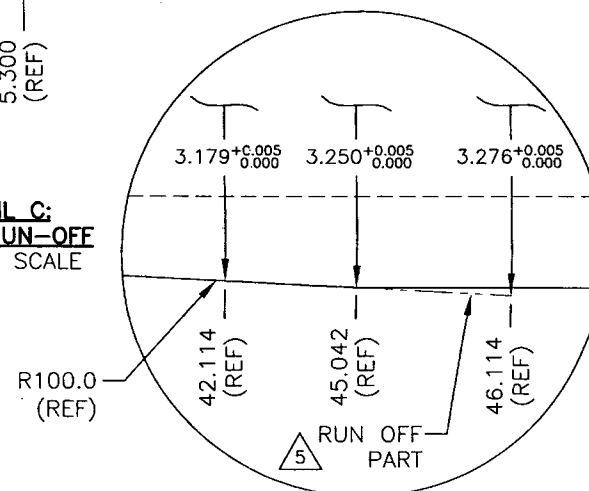
RELEASED
 070424 P
 1000 0000

DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
 TRANSITION**
 SCALE 4:1

**DETAIL C:
 TAPER RUN-OFF**
 NOT TO SCALE



NO. 32150
 WORK ORDER
 WITHOUT NOTICE
 UNCONTROLLED COPY
 SUBJECT TO AMENDMENT
 ENGINEERING
 RETURN TO
 SHOP COPY

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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAWKSBURY, ONTARIO, CANADA
CHECKED PH	APPROVED PH	DRAWING NO. D212-664-241	REV. C SHEET 3 OF 3
DATE 07.03.08	TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE 1:1	